

VII. COMPLIANCE AND ENFORCEMENT HISTORY

Background

Until recently, EPA has focused much of its attention on measuring compliance with specific environmental statutes. This approach allows the Agency to track compliance with the Clean Air Act, the Resource Conservation and Recovery Act, the Clean Water Act, and other environmental statutes. Within the last several years, the Agency has begun to supplement single-media compliance indicators with facility-specific, multimedia indicators of compliance. In doing so, EPA is in a better position to track compliance with all statutes at the facility level, and within specific industrial sectors.

A major step in building the capacity to compile multimedia data for industrial sectors was the creation of EPA's Integrated Data for Enforcement Analysis (IDEA) system. IDEA has the capacity to "read into" the Agency's single-media databases, extract compliance records, and match the records to individual facilities. The IDEA system can match Air, Water, Waste, Toxics/Pesticides/EPCRA, TRI, and Enforcement Docket records for a given facility, and generate a list of historical permit, inspection, and enforcement activity. IDEA also has the capability to analyze data by geographic area and corporate holder. As the capacity to generate multimedia compliance data improves, EPA will make available more in-depth compliance and enforcement information. Additionally, sector-specific measures of success for compliance assistance efforts are under development.

Compliance and Enforcement Profile Description

Using inspection, violation and enforcement data from the IDEA system, this section provides information regarding the historical compliance and enforcement activity of this sector. In order to mirror the facility universe reported in the Toxic Chemical Profile, the data reported within this section consists of records only from the TRI reporting universe. With this decision, the selection criteria are consistent across sectors with certain exceptions. For the sectors that do not normally report to the TRI program, data have been provided from EPA's Facility Indexing System (FINDS) which tracks facilities in all media databases. Please note, in this section, EPA does not attempt to define the actual number of facilities that fall within each sector. Instead, the section portrays the records of a subset of facilities within the sector that are well defined within EPA databases.

As a check on the relative size of the full sector universe, most notebooks contain an estimated number of facilities within the sector according to the Bureau of Census (See Section II). With sectors dominated by small businesses, such as metal finishers and printers, the reporting universe within

the EPA databases may be small in comparison to Census data. However, the group selected for inclusion in this data analysis section should be consistent with this sector's general make-up.

Following this introduction is a list defining each data column presented within this section. These values represent a retrospective summary of inspections and enforcement actions, and reflect solely EPA, State, and local compliance assurance activities that have been entered into EPA databases. To identify any changes in trends, the EPA ran two data queries, one for the past five calendar years (April 1, 1992 to March 31, 1997) and the other for the most recent twelve-month period (April 1, 1996 to March 31, 1997). The five-year analysis gives an average level of activity for that period for comparison to the more recent activity.

Because most inspections focus on single-media requirements, the data queries presented in this section are taken from single media databases. These databases do not provide data on whether inspections are state/local or EPA-led. However, the table breaking down the universe of violations does give the reader a crude measurement of the EPA's and states' efforts within each media program. The presented data illustrate the variations across EPA Regions for certain sectors.⁴ This variation may be attributable to state/local data entry variations, specific geographic concentrations, proximity to population centers, sensitive ecosystems, highly toxic chemicals used in production, or historical noncompliance. Hence, the exhibited data do not rank regional performance or necessarily reflect which regions may have the most compliance problems.

Compliance and Enforcement Data Definitions

General Definitions

Facility Indexing System (FINDS) -- assigns a common facility number to EPA single-media permit records. The FINDS identification number allows EPA to compile and review all permit, compliance, enforcement and pollutant release data for any given regulated facility.

Integrated Data for Enforcement Analysis (IDEA) -- is a data integration system that can retrieve information from the major EPA program office databases. IDEA uses the FINDS identification number to link separate data records from EPA's databases. This allows retrieval of records from across media or statutes for any given facility, thus creating a "master list" of

⁴ EPA Regions include the following states: I (CT, MA, ME, RI, NH, VT); II (NJ, NY, PR, VI); III (DC, DE, MD, PA, VA, WV); IV (AL, FL, GA, KY, MS, NC, SC, TN); V (IL, IN, MI, MN, OH, WI); VI (AR, LA, NM, OK, TX); VII (IA, KS, MO, NE); VIII (CO, MT, ND, SD, UT, WY); IX (AZ, CA, HI, NV, Pacific Trust Territories); X (AK, ID, OR, WA).

records for that facility. Some of the data systems accessible through IDEA are: AFS (Air Facility Indexing and Retrieval System, Office of Air and Radiation), PCS (Permit Compliance System, Office of Water), RCRIS (Resource Conservation and Recovery Information System, Office of Solid Waste), NCDB (National Compliance Data Base, Office of Prevention, Pesticides, and Toxic Substances), CERCLIS (Comprehensive Environmental and Liability Information System, Superfund), and TRIS (Toxic Release Inventory System). IDEA also contains information from outside sources such as Dun and Bradstreet and the Occupational Safety and Health Administration (OSHA). Most data queries displayed in notebook sections IV and VII were conducted using IDEA.

Data Table Column Heading Definitions

Facilities in Search -- are based on the universe of TRI reporters within the listed SIC code range. For industries not covered under TRI reporting requirements (metal mining, nonmetallic mineral mining, electric power generation, ground transportation, water transportation, and dry cleaning), or industries in which only a very small fraction of facilities report to TRI (e.g., printing), the notebook uses the FINDS universe for executing data queries. The SIC code range selected for each search is defined by each notebook's selected SIC code coverage described in Section II.

Facilities Inspected -- indicates the level of EPA and state agency inspections for the facilities in this data search. These values show what percentage of the facility universe is inspected in a one-year or five-year period.

Number of Inspections -- measures the total number of inspections conducted in this sector. An inspection event is counted each time it is entered into a single media database.

Average Time Between Inspections -- provides an average length of time, expressed in months, between compliance inspections at a facility within the defined universe.

Facilities with One or More Enforcement Actions -- expresses the number of facilities that were the subject of at least one enforcement action within the defined time period. This category is broken down further into federal and state actions. Data are obtained for administrative, civil/judicial, and criminal enforcement actions. A facility with multiple enforcement actions is only counted once in this column, e.g., a facility with 3 enforcement actions counts as 1 facility.

Total Enforcement Actions -- describes the total number of enforcement actions identified for an industrial sector across all environmental statutes. A

facility with multiple enforcement actions is counted multiple times, e.g., a facility with 3 enforcement actions counts as 3.

State Lead Actions -- shows what percentage of the total enforcement actions are taken by state and local environmental agencies. Varying levels of use by states of EPA data systems may limit the volume of actions recorded as state enforcement activity. Some states extensively report enforcement activities into EPA data systems, while other states may use their own data systems.

Federal Lead Actions -- shows what percentage of the total enforcement actions are taken by the United States Environmental Protection Agency. This value includes referrals from state agencies. Many of these actions result from coordinated or joint state/federal efforts.

Enforcement to Inspection Rate -- is a ratio of enforcement actions to inspections, and is presented for comparative purposes only. This ratio is a rough indicator of the relationship between inspections and enforcement. It relates the number of enforcement actions and the number of inspections that occurred within the one-year or five-year period. This ratio includes the inspections and enforcement actions reported under the Clean Water Act (CWA), the Clean Air Act (CAA) and the Resource Conservation and Recovery Act (RCRA). Inspections and actions from the TSCA/FIFRA/EPCRA database are not factored into this ratio because most of the actions taken under these programs are not the result of facility inspections. Also, this ratio does not account for enforcement actions arising from non-inspection compliance monitoring activities (e.g., self-reported water discharges) that can result in enforcement action within the CAA, CWA, and RCRA.

Facilities with One or More Violations Identified -- indicates the percentage of inspected facilities having a violation identified in one of the following data categories: In Violation or Significant Violation Status (CAA); Reportable Noncompliance, Current Year Noncompliance, Significant Noncompliance (CWA); Noncompliance and Significant Noncompliance (FIFRA, TSCA, and EPCRA); Unresolved Violation and Unresolved High Priority Violation (RCRA). The values presented for this column reflect the extent of noncompliance within the measured time frame, but do not distinguish between the severity of the noncompliance. Violation status may be a precursor to an enforcement action, but does not necessarily indicate that an enforcement action will occur.

Media Breakdown of Enforcement Actions and Inspections -- four columns identify the proportion of total inspections and enforcement actions within EPA Air, Water, Waste, and TSCA/FIFRA/EPCRA databases. Each column is a percentage of either the "Total Inspections," or the "Total

Actions” column.

VII.A. Aerospace Industry Compliance History

Table 14 provides an overview of the reported compliance and enforcement data for the aerospace industry over the past five years (April 1992 to April 1997). These data are also broken out by EPA Regions thereby permitting geographical comparisons. A few points evident from the data are listed below.

- Region IX and Region I had the most enforcement actions (43 and 36 respectively), accounting for 62 percent of the total enforcement actions and only 29 percent of the total inspections. Thus, these two Regions had the highest enforcement/inspection ratios (0.26 and 0.19).
- Region IV had significantly more inspections (325) than the other Regions, 27 percent of the total, but only 13 percent of enforcement actions.
- Enforcement actions were primarily state-lead (75 percent), especially in Regions with the greatest number of enforcement actions.
- Region V had the highest average time between inspections (23 months), which means that fewer inspections, in relation to the number of facilities, were done in Region V than in other Regions.

Table 14: Five-Year Enforcement and Compliance Summary for the Aerospace Industry									
A	B	C	D	E	F	G	H	I	J
Region	Facilities in Search	Facilities Inspected	Number of Inspections	Average Months Between Inspections	Facilities with 1 or More Enforcement Actions	Total Enforcement Actions	Percent State Lead Actions	Percent Federal Lead Actions	Enforcement to Inspection Rate
I	34	28	185	11	16	36	50%	50%	0.19
II	7	6	29	14	3	3	67%	33%	0.10
III	12	9	117	6	4	6	83%	17%	0.05
IV	38	34	325	7	12	16	94%	6%	0.05
V	37	27	97	23	2	3	67%	33%	0.03
VI	37	27	134	17	7	14	79%	21%	0.10
VII	8	7	54	9	2	2	50%	50%	0.04
VIII	7	4	29	14	2	2	100%	0%	0.03
IX	47	33	163	17	17	43	93%	7%	0.26
X	10	9	73	8	2	2	0%	100%	0.03
TOTAL	237	184	1206	12	67	127	75%	25%	0.10

VII.B. Comparison of Enforcement Activity Between Selected Industries

Tables 15 and 16 allow the compliance history of the aerospace sector to be compared to the other industries covered by the industry sector notebooks. Comparisons between Tables 15 and 16 permit the identification of trends in compliance and enforcement records of the various industries by comparing data covering the last five years (April 1992 to April 1997) to that of the past year (April 1996 to April 1997). Some points evident from the data are listed below.

- The one-year enforcement/inspection ratio (0.05) is only half of the five-year ratio (0.10).
- The aerospace industry data approximate the averages of the industries shown for enforcement/inspection ratios, state-lead versus federal-lead actions, and facilities with one or more violations and enforcement actions.

Tables 17 and 18 provide a more in-depth comparison between the aerospace industry and other sectors by breaking out the compliance and enforcement data by environmental statute. As in the previous Tables (Tables 15 and 16), the data cover the last five years (Table 17) and the last one year (Table 18) to facilitate the identification of recent trends. A few points evident from the data are listed below.

- The aerospace industry has the highest percentage of RCRA inspections (54 percent of total) of any industry.
- The one-year versus five-year breakdowns in terms of percent of total inspections do not differ significantly. However, the percent of total actions pertaining to RCRA increased from 42 percent to 55 percent in the past year. CWA actions decreased from 11 percent to zero percent in the last year.

Table 15: Five-Year Enforcement and Compliance Summary for Selected Industries									
A	B	C	D	E	F	G	H	I	J
Industry Sector	Facilities in Search	Facilities Inspected	Number of Inspections	Average Months Between Inspections	Facilities with 1 or More Enforcement Actions	Total Enforcement Actions	Percent State Lead Actions	Percent Federal Lead Actions	Enforcement to Inspection Rate
Metal Mining	1,232	378	1,600	46	63	111	53%	47%	0.07
Coal Mining	3,256	741	3,748	52	88	132	89%	11%	0.04
Oil and Gas Extraction	4,676	1,902	6,071	46	149	309	79%	21%	0.05
Non-Metallic Mineral Mining	5,256	2,803	12,826	25	385	622	77%	23%	0.05
Textiles	355	267	1,465	15	53	83	90%	10%	0.06
Lumber and Wood	712	473	2,767	15	134	265	70%	30%	0.10
Furniture	499	386	2,379	13	65	91	81%	19%	0.04
Pulp and Paper	484	430	4,630	6	150	478	80%	20%	0.10
Printing	5,862	2,092	7,691	46	238	428	88%	12%	0.06
Inorganic Chemicals	441	286	3,087	9	89	235	74%	26%	0.08
Resins and Manmade Fibers	329	263	2,430	8	93	219	76%	24%	0.09
Pharmaceuticals	164	129	1,201	8	35	122	80%	20%	0.10
Organic Chemicals	425	355	4,294	6	153	468	65%	35%	0.11
Agricultural Chemicals	263	164	1,293	12	47	102	74%	26%	0.08
Petroleum Refining	156	148	3,081	3	124	763	68%	32%	0.25
Rubber and Plastic	1,818	981	4,383	25	178	276	82%	18%	0.06
Stone, Clay, Glass and Concrete	615	388	3,474	11	97	277	75%	25%	0.08
Iron and Steel	349	275	4,476	5	121	305	71%	29%	0.07
Metal Castings	669	424	2,535	16	113	191	71%	29%	0.08
Nonferrous Metals	203	161	1,640	7	68	174	78%	22%	0.11
Fabricated Metal Products	2,906	1,858	7,914	22	365	600	75%	25%	0.08
Electronics	1,250	863	4,500	17	150	251	80%	20%	0.06
Automobile Assembly	1,260	927	5,912	13	253	413	82%	18%	0.07
Aerospace	237	184	1,206	12	67	127	75%	25%	0.10
Shipbuilding and Repair	44	37	243	9	20	32	84%	16%	0.13
Ground Transportation	7,786	3,263	12,904	36	375	774	84%	16%	0.06
Water Transportation	514	192	816	38	36	70	61%	39%	0.09
Air Transportation	444	231	973	27	48	97	88%	12%	0.10
Fossil Fuel Electric Power	3,270	2,166	14,210	14	403	789	76%	24%	0.06
Dry Cleaning	6,063	2,360	3,813	95	55	66	95%	5%	0.02

A Industry Sector	B Facilities in Search	C Facilities Inspected	D Number of Inspections	E		F		G Total Enforcement Actions	H Enforcement to Inspection Rate
				Facilities with 1 or More Violations		Facilities with 1 or more Enforcement Actions			
				Number	Percent*	Number	Percent*		
Metal Mining	1,232	142	211	102	72%	9	6%	10	0.05
Coal Mining	3,256	362	765	90	25%	20	6%	22	0.03
Oil and Gas Extraction	4,676	874	1,173	127	15%	26	3%	34	0.03
Non-Metallic Mineral Mining	5,256	1,481	2,451	384	26%	73	5%	91	0.04
Textiles	355	172	295	96	56%	10	6%	12	0.04
Lumber and Wood	712	279	507	192	69%	44	16%	52	0.10
Furniture	499	254	459	136	54%	9	4%	11	0.02
Pulp and Paper	484	317	788	248	78%	43	14%	74	0.09
Printing	5,862	892	1,363	577	65%	28	3%	53	0.04
Inorganic Chemicals	441	200	548	155	78%	19	10%	31	0.06
Resins and Manmade Fibers	329	173	419	152	88%	26	15%	36	0.09
Pharmaceuticals	164	80	209	84	105%	8	10%	14	0.07
Organic Chemicals	425	259	837	243	94%	42	16%	56	0.07
Agricultural Chemicals	263	105	206	102	97%	5	5%	11	0.05
Petroleum Refining	156	132	565	129	98%	58	44%	132	0.23
Rubber and Plastic	1,818	466	791	389	83%	33	7%	41	0.05
Stone, Clay, Glass and Concrete	615	255	678	151	59%	19	7%	27	0.04
Iron and Steel	349	197	866	174	88%	22	11%	34	0.04
Metal Castings	669	234	433	240	103%	24	10%	26	0.06
Nonferrous Metals	203	108	310	98	91%	17	16%	28	0.09
Fabricated Metal	2,906	849	1,377	796	94%	63	7%	83	0.06
Electronics	1,250	420	780	402	96%	27	6%	43	0.06
Automobile Assembly	1,260	507	1,058	431	85%	35	7%	47	0.04
Aerospace	237	119	216	105	88%	8	7%	11	0.05
Shipbuilding and Repair	44	22	51	19	86%	3	14%	4	0.08
Ground Transportation	7,786	1,585	2,499	681	43%	85	5%	103	0.04
Water Transportation	514	84	141	53	63%	10	12%	11	0.08
Air Transportation	444	96	151	69	72%	8	8%	12	0.08
Fossil Fuel Electric Power	3,270	1,318	2,430	804	61%	100	8%	135	0.06
Dry Cleaning	6,063	1,234	1,436	314	25%	12	1%	16	0.01

*Percentages in Columns E and F are based on the number of facilities inspected (Column C). Percentages can exceed 100% because violations and actions can occur without a facility inspection.

Table 17: Five-Year Inspection and Enforcement Summary by Statute for Selected Industries

Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		RCRA		FIFRA/TSCA	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Metal Mining	378	1,600	111	39%	19%	52%	52%	8%	12%	1%	17%
Coal Mining	741	3,748	132	57%	64%	38%	28%	4%	8%	1%	1%
Oil and Gas Extraction	1,902	6,071	309	75%	65%	16%	14%	8%	18%	0%	3%
Non-Metallic Mineral Mining	2,803	12,826	622	83%	81%	14%	13%	3%	4%	0%	3%
Textiles	267	1,465	83	58%	54%	22%	25%	18%	14%	2%	6%
Lumber and Wood	473	2,767	265	49%	47%	6%	6%	44%	31%	1%	16%
Furniture	386	2,379	91	62%	42%	3%	0%	34%	43%	1%	14%
Pulp and Paper	430	4,630	478	51%	59%	32%	28%	15%	10%	2%	4%
Printing	2,092	7,691	428	60%	64%	5%	3%	35%	29%	1%	4%
Inorganic Chemicals	286	3,087	235	38%	44%	27%	21%	34%	30%	1%	5%
Resins and Manmade Fibers	263	2,430	219	35%	43%	23%	28%	38%	23%	4%	6%
Pharmaceuticals	129	1,201	122	35%	49%	15%	25%	45%	20%	5%	5%
Organic Chemicals	355	4,294	468	37%	42%	16%	25%	44%	28%	4%	6%
Agricultural Chemicals	164	1,293	102	43%	39%	24%	20%	28%	30%	5%	11%
Petroleum Refining	148	3,081	763	42%	59%	20%	13%	36%	21%	2%	7%
Rubber and Plastic	981	4,383	276	51%	44%	12%	11%	35%	34%	2%	11%
Stone, Clay, Glass and Concrete	388	3,474	277	56%	57%	13%	9%	31%	30%	1%	4%
Iron and Steel	275	4,476	305	45%	35%	26%	26%	28%	31%	1%	8%
Metal Castings	424	2,535	191	55%	44%	11%	10%	32%	31%	2%	14%
Nonferrous Metals	161	1,640	174	48%	43%	18%	17%	33%	31%	1%	10%
Fabricated Metal	1,858	7,914	600	40%	33%	12%	11%	45%	43%	2%	13%
Electronics	863	4,500	251	38%	32%	13%	11%	47%	50%	2%	7%
Automobile Assembly	927	5,912	413	47%	39%	8%	9%	43%	43%	2%	9%
Aerospace	184	1,206	127	34%	38%	10%	11%	54%	42%	2%	9%
Shipbuilding and Repair	37	243	32	39%	25%	14%	25%	42%	47%	5%	3%
Ground Transportation	3,263	12,904	774	59%	41%	12%	11%	29%	45%	1%	3%
Water Transportation	192	816	70	39%	29%	23%	34%	37%	33%	1%	4%
Air Transportation	231	973	97	25%	32%	27%	20%	48%	48%	0%	0%
Fossil Fuel Electric Power	2,166	14,210	789	57%	59%	32%	26%	11%	10%	1%	5%
Drv Cleaning	2,360	3,813	66	56%	23%	3%	6%	41%	71%	0%	0%

Table 18: One-Year Inspection and Enforcement Summary by Statute for Selected Industries											
Industry Sector	Facilities Inspected	Total Inspections	Total Enforcement Actions	Clean Air Act		Clean Water Act		RCRA		FIFRA/TSCA/EPCRA/Other	
				% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions	% of Total Inspections	% of Total Actions
Metal Mining	142	211	10	52%	0%	40%	40%	8%	30%	0%	30%
Coal Mining	362	765	22	56%	82%	40%	14%	4%	5%	0%	0%
Oil and Gas Extraction	874	1,173	34	82%	68%	10%	9%	9%	24%	0%	0%
Non-Metallic Mineral Mining	1,481	2,451	91	87%	89%	10%	9%	3%	2%	0%	0%
Textiles	172	295	12	66%	75%	17%	17%	17%	8%	0%	0%
Lumber and Wood	279	507	52	51%	30%	6%	5%	44%	25%	0%	40%
Furniture	254	459	11	66%	45%	2%	0%	32%	45%	0%	9%
Pulp and Paper	317	788	74	54%	73%	32%	19%	14%	7%	0%	1%
Printing	892	1,363	53	63%	77%	4%	0%	33%	23%	0%	0%
Inorganic Chemicals	200	548	31	35%	59%	26%	9%	39%	25%	0%	6%
Resins and Manmade Fibers	173	419	36	38%	51%	24%	38%	38%	5%	0%	5%
Pharmaceuticals	80	209	14	43%	71%	11%	14%	45%	14%	0%	0%
Organic Chemicals	259	837	56	40%	54%	13%	13%	47%	34%	0%	0%
Agricultural Chemicals	105	206	11	48%	55%	22%	0%	30%	36%	0%	9%
Petroleum Refining	132	565	132	49%	67%	17%	8%	34%	15%	0%	10%
Rubber and Plastic	466	791	41	55%	64%	10%	13%	35%	23%	0%	0%
Stone, Clay, Glass and Concrete	255	678	27	62%	63%	10%	7%	28%	30%	0%	0%
Iron and Steel	197	866	34	52%	47%	23%	29%	26%	24%	0%	0%
Metal Castings	234	433	26	60%	58%	10%	8%	30%	35%	0%	0%
Nonferrous Metals	108	310	28	44%	43%	15%	20%	41%	30%	0%	7%
Fabricated Metal	849	1,377	83	46%	41%	11%	2%	43%	57%	0%	0%
Electronics	420	780	43	44%	37%	14%	5%	43%	53%	0%	5%
Automobile Assembly	507	1,058	47	53%	47%	7%	6%	41%	47%	0%	0%
Aerospace	119	216	11	37%	36%	7%	0%	54%	55%	1%	9%
Shipbuilding and Repair	22	51	4	54%	0%	11%	50%	35%	50%	0%	0%
Ground Transportation	1,585	2,499	103	64%	46%	11%	10%	26%	44%	0%	1%
Water Transportation	84	141	11	38%	9%	24%	36%	38%	45%	0%	9%
Air Transportation	96	151	12	28%	33%	15%	42%	57%	25%	0%	0%
Fossil Fuel Electric Power	1,318	2,430	135	59%	73%	32%	21%	9%	5%	0%	0%
Dry Cleaning	1,234	1,436	16	69%	56%	1%	6%	30%	38%	0%	0%

VII.C. Review of Major Legal Actions

Major Cases/Supplemental Environmental Projects

This section provides summary information about major cases that have affected this sector, and a list of Supplemental Environmental Projects (SEPs).

VII.C.1. Review of Major Cases

As indicated in EPA's *Enforcement Accomplishments Report, FY1995 and FY1996* publications, one significant enforcement action was resolved between 1995 and 1996 for the aerospace industry.

U.S. v. General Electric Company General Electric (GE) operates a facility in Lynn, MA at which the company tests and manufactures aircraft. The enforcement issues arose from GE's failure to obtain prevention of significant deterioration (PSD) permits for one boiler and for four test cells used for the testing of jet engines. The boiler and the test cells emit NO_x in quantities that trigger the PSD new source review requirements of the Clean Air Act. GE installed/constructed two new test cells in the early 1980s and modified two test cells in the late 1980s, without obtaining required permits. GE installed/constructed the boiler without obtaining an adequate permit. The boiler also emitted NO_x in excess of the levels permissible in EPA's New Source Performance Standards (NSPS).

VII.C.2. Supplementary Environmental Projects (SEPs)

SEPs are compliance agreements that reduce a facility's non-compliance penalty in return for an environmental project that exceeds the value of the reduction. Often, these projects fund pollution prevention activities that can reduce the future pollutant loadings of a facility. Information on SEP cases can be accessed via the internet at the SEP National Database, <http://es.epa.gov/oeca/sep/sepdb>.

Aerospace Techniques, Inc., in Cromwell, Connecticut, performed a SEP in return for failing to submit a Toxic Release Inventory Form R for 1,1,1-trichloroethane. Aerospace Techniques achieved a 4,500 pound reduction in 1,1,1-trichloroethane releases by replacing the larger of its two vapor degreasers with jet washing machines using heated aqueous cleaning solution. They also plan to scale back degreasing operations to final rinses and replace six interim part-rinsing stations that utilize aqueous cleaner. The cost of this project was \$9,766.

VIII. COMPLIANCE ASSURANCE ACTIVITIES AND INITIATIVES

This section highlights the activities undertaken by this industry sector and public agencies to voluntarily improve the sector's environmental performance. These activities include those initiated independently by industrial trade associations. In this section, the notebook also contains a listing and description of national and regional trade associations.

VIII.A. Sector-related Environmental Programs and Activities

VIII.A.1. Federal Activities

Propulsion Environmental Working Group

The Propulsion Environmental Working Group (PEWG) was formally chartered in 1994 by the Joint Propulsion Coordinating Committee (JPCC), a consortium of industry and Department of Defense participants. PEWG is composed of members from the Army, Navy, and Air Force, and of companies such as Allied Signal, GE Aircraft Engines, Allison Engine, Williams Intl., P&W UTC, Teledyne, Continental, and Sundstrand.

PEWG's chartered objectives include:

- providing an open forum for information exchange on possible technologies to eliminate HAZMATs,
- assisting team members with decisions regarding HAZMATs, identifying HAZMATs, and assisting in prevention and control of HAZMATs,
- assisting engine manufacturers and reworkers with compliance of state and federal regulations,
- ensuring and assisting in the completion of required environmental documentation such as EAs or EIAs,
- establishing committees to address topics of interest for the team members.

Propulsion Product Group

The Air Force Propulsion Product Group (PPG) works to incorporate environmental, safety, and occupational health concerns into multiple weapon systems. The PPG is a participant in the Propulsion Environmental Working Group discussed above. Some of the accomplishment of the PPG are:

- eliminating the use of Class I Ozone Depleting Substances (ODS)
- reducing the use of EPA-17 materials
- facilitating the annual reduction of EPA-17 materials and Class I ODS's used by OEM's.

Airworthiness Assurance Center of Excellence

The FAA created the Airworthiness Assurance Center of Excellence (AACE) in September 1997 in an effort to “make a significant contribution to the reduction of accident rates over the next five years.” AACE is based at Iowa State University and Ohio State University. The five principal areas of research are maintenance, inspection and repair, propulsion and fuel systems safety, crashworthiness, advanced materials, and landing gear systems performance and safety. A focus of the work is to develop crack detection methods for particularly small cracks which may be under several layers of skin. Major airlines are also pushing for inspection techniques which do not require disassembly, thus preserving sealants and coatings (*AW&ST*, 3/30/98).

Joint EPA/NASA/USAF Interagency Depainting Study

NASA is conducting a technical assessment of alternative technologies for aerospace depainting operations on behalf of the EPA and the US Air Force. Such technologies are to be used as paint stripping processes which do not adversely affect the environment and which specifically do not involve the use of methylene chloride. The nine techniques subdivided into five removal method categories (abrasive, impact, cryogenic, thermal, and molecular bonding disassociation).

Thai Airways/Government of Thailand/USEPA Solvent Elimination Project

The Government of Thailand, Thai Airways, and the USEPA Solvent Elimination Project studied methods of eliminating CFC-113 and methyl chloroform use. This project was undertaken as part of the World Bank Global Solvents Project under the Multilateral Fund of the Montreal Protocol. The manual developed under this project describes a step-by-step approach for characterizing the use of ozone-depleting solvents and identifying and evaluating alternatives. For case studies on this topic, see *Eliminating CFC-113 and Methyl Chloroform in Aircraft Maintenance Procedures*, published by the Office of Air and Radiation of the USEPA in October 1993.

VIII.B. EPA Voluntary Programs*33/50 Program*

The 33/50 Program is a groundbreaking program that has focused on reducing pollution from seventeen high-priority chemicals through voluntary partnerships with industry. The program's name stems from its goals: a 33% reduction in toxic releases by 1992, and a 50% reduction by 1995, against a baseline of 1.5 billion pounds of releases and transfers in 1988. The results have been impressive: 1,300 companies joined the 33/50 Program (representing over 6,000 facilities) and reached the national targets a year

ahead of schedule. The 33% goal was reached in 1991, and the 50% goal -- a reduction of 745 million pounds of toxic wastes -- was reached in 1994. The 33/50 Program can provide case studies on many of the corporate accomplishments in reducing waste (Contact 33/50 Program Director David Sarokin -- 202-260-6396).

Table 19 lists those companies participating in the 33/50 program that reported four-digit SIC codes within 372 and 376 to TRI. Some of the companies shown also listed facilities that are not producing aerospace products. The number of facilities within each company that are participating in the 33/50 program and that report aerospace SIC codes is shown. Where available and quantifiable against 1988 releases and transfers, each company's 33/50 goals for 1995 and the actual total releases and transfers and percent reduction between 1988 and 1995 are presented. Thirteen of the seventeen 33/50 target chemicals were reported to TRI by aerospace facilities in 1995. These 13 chemicals accounted for 77 percent of the total releases and 65 percent of the total transfers reported to the 1995 TRI by aerospace facilities.

Table 19 shows that 47 companies comprised of 506 facilities reporting SIC 372 and 376 participated in the 33/50 program. For those companies shown with more than one aerospace facility, all facilities may not have participated in 33/50. The 33/50 goals shown for companies with multiple aerospace facilities, however, are company-wide, potentially aggregating more than one facility and facilities not carrying out aerospace operations. In addition to company-wide goals, individual facilities within a company may have had their own 33/50 goals or may be specifically listed as not participating in the 33/50 program. Since the actual percent reductions shown in the last column apply to all of the companies' aerospace facilities and only aerospace facilities, direct comparisons to those company goals incorporating non-aerospace facilities or excluding certain facilities may not be possible. For information on specific facilities participating in 33/50, contact David Sarokin (202-260-6907) at the 33/50 Program Office.

With the completion of the 33/50 program, several lessons were learned. Industry and the environment benefitted by this program for several reasons. Companies were willing to participate because cost savings and risk reduction were measurable and no additional record keeping and reporting was required. The goals of the program were clear and simple and EPA allowed industry to achieve the goals in whatever manner they could. Therefore, when companies can see the benefits of environmental programs and be an active part of the decision-making process, they are more likely to participate.

Table 19: Aerospace Industry Participation in the 33/50 Program

Parent Company (Headquarters Location)	Company- Owned Aerospace Facilities Reporting 33/50 Chemicals	Company- Wide % Reduction Goal ¹ (1988- 1995)	1988 TRI Releases and Transfers of 33/50 Chemicals (pounds) ²	1995 TRI Releases and Transfers of 33/50 Chemicals (pounds) ²	Actual % Reduction for Aerospace Facilities (1988-1995)
Aeroforce Corp.- Muncie, IN	1	0	1,500	8,601	-473%
Aerothrust Corp.- Miami, FL	1	100	72,500	9,995	86%
Allied-Signal Inc.- Morristown, NJ	91	50	6,018,249	1,535,148	74%
Aluminum Co. of America- Pittsburgh, PA	1	51	220,733	83,830	62%
Arkwin Industries- Westbury, NY	1	50	134,100	0	100%
Arrowhead Holdings Corp.- Bala Cynwyd, PA	1	0	39,855	24,800	38%
BF Goodrich Co.- Akron, OH	30	49	2,251,997	1,109,800	51%
Boeing Commercial Airplane- Seattle, WA	24	50	13,471,898	2,251,461	83%
Chemical Milling Intl. Corp.- Rosamond, CA	2	0	234,356	0	100%
Chrysler Corp.- Auburn Hills, MI	2	80	43,155	154,561	-258%
Ciba-Geigy Corp.- Tarrytown, NY	1	50	81,555	17,650	78%
Dassault Falcon Jet Corp.- Paramus, NJ	2	40	355,070	34,005	90%
Dynamic Metal Prods. Co.- Manchester, CT	1	0	0	0	---
Eaton Corp.- Cleveland, OH	1	50	22,199	0	100%
FR Holdings Inc.- Aurora, CO	2	32	124,250	0	100%
Gencorp Inc.- Akron, OH	14	33	7,639,190	3,412,754	55%
General Dynamics Corp.- Falls Church, VA	3	81	291,110	24,755	91%
General Electric Corp.- Fairfield, CT	130	50	19,129,041	4,557,753	76%
General Motors Corp.- Detroit, MI	3	0	483,255	0	100%
Globe Engineering Co.- Wichita, KS	1	0	0	15,740	---
Howmet Corp.- Greenwich, CT	5	0	56,240	15,905	72%
Interlake Corp.- Lisle, IL	1	37	224,486	5,116	98%
JT Slocomb Co.- South Glastonbury, CT	2	50	41,001	0	100%
K Systems Inc.- Foster City, CA	2	0	0	0	---
Kimberly-Clark Corp.- Irving, TX	1	50	0	0	---
Large Structrals Business Ops.- Portland, OR	5	26	89,890	68,538	24%
Lockheed Martin Corp.- Bethesda, MD	41	42	6,121,565	520,120	92%
Lucas Industries- Troy, MI	7	14	229,051	47,555	79%
McDonnell Douglas Corp.- St. Louis, MO	14	50	4,619,458	903,626	80%
Meco Inc. Paris, IL	1	0	36,162	78,792	118%
NMB USA Inc.- Chatsworth, CA	1	0	0	0	---
Northrop Grumman Corp.- Los Angeles, CA	11	35	2,339,803	731,032	69%
Pall Rai Inc.- Hauppauge, NY	2	31	43,900	46,763	-7%
Parker Hannifin Corp.- Cleveland, OH	6	50	143,380	0	100%
Raytheon Co.- Lexington, MA	3	50	1,036,083	355,298	66%
Rockwell Intl. Corp.- Seal Beach, CA	2	50	150,513	0	100%

Parent Company (Headquarters Location)	Company- Owned Aerospace Facilities Reporting 33/50 Chemicals	Company- Wide % Reduction Goal ¹ (1988- 1995)	1988 TRI Releases and Transfers of 33/50 Chemicals (pounds) ²	1995 TRI Releases and Transfers of 33/50 Chemicals (pounds) ²	Actual % Reduction for Aerospace Facilities (1988-1995)
Rohr Industries Inc.- Chula Vista, CA	7	25	1,849,382	436,056	76%
SEGL Inc.- Los Angeles, CA	1	13	75,000	23,005	69%
SKF USA Inc.- King of Prussia, PA	1	0	0	0	---
Skyline Products- Harrisburg, OR	1	0	0	0	---
Sundstrand Corp.- Rockford, IL	3	0	494,750	4,293	85%
Talley Industries Inc.- Phoenix, AZ	9	0	133,323	177,213	-33%
Thiokol Corp.- Ogden, UT	14	40	2,687,295	788,979	71%
Trinova Corp.- Maumee, OH	1	50	0	14,400	---
United Technologies Corp.- Hartford, CT	60	50	8,496,888	952,497	89%
US Air Force- Washington, DC	4	0	1,643,050	460,159	72%
Total	517	---	81,125,233	18,940,200	77%

Source: U.S. EPA 33/50 Program Office, 1996.

¹ Company-Wide Reduction Goals aggregate all company-owned facilities which may include facilities not producing aerospace products.

² Releases and Transfers are from aerospace facilities only.

Project XL

Project XL was initiated in March 1995 as a part of President Clinton's *Reinventing Environmental Regulation* initiative. The projects seek to achieve cost effective environmental benefits by providing participants regulatory flexibility on the condition that they produce greater environmental benefits. EPA and program participants will negotiate and sign a Final Project Agreement, detailing specific environmental objectives that the regulated entity shall satisfy. EPA will provide regulatory flexibility as an incentive for the participants' superior environmental performance. Participants are encouraged to seek stakeholder support from local governments, businesses, and environmental groups. EPA hopes to implement fifty pilot projects in four categories, including industrial facilities, communities, and government facilities regulated by EPA. Applications will be accepted on a rolling basis. For additional information regarding XL projects, including application procedures and criteria, see the May 23, 1995 Federal Register Notice. (Contact: Fax-on-Demand Hotline 202-260-8590, Web: <http://www.epa.gov/ProjectXL>, or Christopher Knopes in EPA's Office of Reinvention 202-260-9298)

Energy Star® Buildings and Green Lights® Partnership

In 1991, EPA introduced Green Lights®, a program designed for businesses and organizations to proactively combat pollution by installing energy-efficient lighting technologies in their commercial and industrial buildings. In April 1995, Green Lights® expanded into Energy Star® Buildings-- a strategy that optimizes whole-building energy-efficiency opportunities.

The energy needed to run commercial and industrial buildings in the United States produces 19 percent of U.S. carbon dioxide emissions, 12 percent of nitrogen oxides, and 25 percent of sulfur dioxide, at a cost of 110 billion dollars a year. If implemented in every U.S. commercial and industrial building, Energy Star® Buildings' upgrade approach could prevent up to 35 percent of the emissions associated with these buildings and cut the nation's energy bill by up to 25 billion dollars annually.

The over 2,500 participants include corporations, small businesses, universities, health care facilities, nonprofit organizations, school districts, and federal and local governments. As of January 1, 1998, Energy Star® Buildings and Green Lights® Program participants have reduced their annual energy use by 7 billion kilowatt hours and annually save more than 517 million dollars. By joining, participants agree to upgrade 90 percent of their owned facilities with energy-efficient lighting and 50 percent of their owned facilities with whole-building upgrades, where profitable, over a seven-year period. Energy Star participants first reduce their energy loads with the Green Lights approach to building tune-ups, then focus on "right sizing" their heating and cooling equipment to match their new energy needs. EPA predicts this strategy will prevent more than 5.5 MMTCE of carbon dioxide by the year 2000. EPA's Office of Air and Radiation is responsible for operating the Energy Star Buildings and Green Lights Program. (Contact the Energy Star Hotline number, 1-888-STAR-YES (1-888-872-7937) or Maria Tikoff Vargas, Co-Director at (202) 564-9178 or visit the website at <http://www.epa.gov/buildings>.)

WasteWi\$e Program

The WasteWi\$e Program was started in 1994 by EPA's Office of Solid Waste and Emergency Response. The program is aimed at reducing municipal solid wastes by promoting waste prevention, recycling collection and the manufacturing and purchase of recycled products. As of 1998, the program had about 700 business, government, and institutional partners. Partners agree to identify and implement actions to reduce their solid wastes setting waste reduction goals and providing EPA with yearly progress reports for a three year period. EPA, in turn, provides partners with technical assistance, publications, networking opportunities, and national and regional recognition. (Contact: WasteWi\$e Hotline at 1-800-372-9473 or Joanne Oxley, EPA

Program Manager, 703-308-0199)

NICE³

The U.S. Department of Energy sponsors a grant program called *National Industrial Competitiveness through Energy, Environment, and Economics* (NICE³). The NICE³ program provides funding to state and industry partnerships (large and small business) for projects demonstrating advances in energy efficiency and clean production technologies. The goal of the NICE³ program is to demonstrate the performance and economics of innovative technologies in the U.S., leading to the commercialization of improved industrial manufacturing processes. These processes should conserve energy, reduce waste, and improve industrial cost-competitiveness. Industry applicants must submit project proposals through a state energy, pollution prevention, or business development office. The following focus industries, which represent the dominant energy users and waste generators in the U.S. manufacturing sector, are of particular interest to the program: Aluminum, Chemicals, Forest Products, Glass, Metal-casting, and Steel. Awardees receive a one-time, three-year grant of up to \$400,000, representing up to 50 percent of a project's total cost. In addition, up to \$25,000 is available to support the state applicant's cost share. (Contact: <http://www.oit.doe.gov/Access/nice3>, Steve Blazek, DOE, 303-275-4723 or Eric Hass, DOE, 303-275-4728)

Design for the Environment (DfE)

DfE is working with several industries to identify cost-effective pollution prevention strategies that reduce risks to workers and the environment. DfE helps businesses compare and evaluate the performance, cost, pollution prevention benefits, and human health and environmental risks associated with existing and alternative technologies. The goal of these projects is to encourage businesses to consider and use cleaner products, processes, and technologies. For more information about the DfE Program, call (202) 260-1678. To obtain copies of DfE materials or for general information about DfE, contact EPA's Pollution Prevention Information Clearinghouse at (202) 260-1023 or visit the DfE Website at <http://www.epa.gov/dfc>.

Several DfE projects have been completed pertaining to the aerospace industry. Brief descriptions follow.

The National Science Foundation (NSF), the State of Massachusetts, the Biodegradable Polymer Research Center, the Toxics Use Reduction Institute, and the Center for Environmentally Advanced Materials were partners in a DfE project on aerospace metal degreasing.

EPA established an interagency agreement with the Department of Energy, in partnership with the Joint Association for the Advancement of Supercritical Technology, to determine the suitability of supercritical carbon dioxide as an alternative method for cleaning and degreasing parts. The degree of contaminant removal of the cleaners as well as human health and environmental effects were evaluated under this project. In another agreement with the Department of Energy, EPA obtained the services of the Oak Ridge National Laboratory to perform research and prepare toxicity summaries in support of EPA risk assessment activities conducted on all segments of the aerospace DfE project.

The Experimental Aircraft Association (EAA) was awarded by the EPA for a demonstration project in small aircraft paint stripping. This project, begun as a DfE project jointly run by OPPT and the Coast Guard, explored alternatives to methylene chloride and other hazardous solvent paint strippers. In the summer of 1997, the EAA completely stripped and repainted a small plane using products that contained no chemicals on the EPA's Hazardous Air Pollutant list and that met the definition of low volatile organic chemical (VOC) releases (P2 Newsletter, 1997).

Small Business Compliance Assistance Centers

The Office of Compliance, in partnership with industry, academic institutions, environmental groups, and other federal and state agencies, has established national Compliance Assistance Centers for four specific industry sectors heavily populated with small businesses that face substantial federal regulation. These sectors are printing, metal finishing, automotive services and repair, agriculture, painted coatings, small chemical manufacturers, municipalities, and transportation.

The purpose of the Centers is to improve compliance of the customers they serve by increasing their awareness of the pertinent federal regulatory requirements and by providing the information that will enable them to achieve compliance. The Centers accomplish this by offering the following:

- “First-Stop Shopping” - serve as the first place that small businesses and technical assistance providers go to get comprehensive, easy to understand compliance information targeted specifically to industry sectors.
- “Improved Information Transfer” - via the Internet and other means, create linkages between the small business community and providers of technical and regulatory assistance and among the providers themselves to share tools and knowledge and prevent duplication of efforts.
- “Compliance Assistance Tools” - develop and disseminate plain-English

guides, consolidated checklists, fact sheets, and other tools where needed by small businesses and their information providers.

- “Links Between Pollution Prevention and Compliance Goals” - provide easy access to information and technical assistance on technologies to help minimize waste generation and maximize environmental performance.

- “Information on Ways to Reduce the Costs of Compliance” - identify technologies and best management practices that reduce pollution while saving money.

For general information regarding EPA’s compliance assistance centers, contact Lynn Vendinello at (202)564-7066, or go to <http://www.epa.gov/oeca/mfcac.html>.

VIII.C. Trade Association/Industry Sponsored Activity

VIII.C.1. Industry Research Programs

NASA Langley Research Center and the Tidewater Interagency P2 Program

NASA's Langley Research Center (LaRC) is devoted to aeronautics and space research and has initiated a broad-based pollution prevention program guided by a Pollution Prevention Program Plan and implemented through specific projects. The Program Plan contains an environmental baseline, opportunities for P2, and establishes a framework to plan, implement, and monitor specific prioritized P2 projects. LaRC is one of the participants in the Tidewater Interagency Pollution Prevention Program (TIPPP). TIPPP was developed under an interagency agreement and designed to integrate P2 concepts and practices at Federal installations in the Tidewater, Virginia area.

Air Force Center for Environmental Excellence

The Air Force Center for Environmental Excellence (AFCEE) is working toward environmental leadership and pollution prevention. The Environmental Quality Directorate of the AFCEE has developed a Base Pollution Prevention Management Action Plan (PPMAP). Each base environmental manager must submit a PPMAP for his/her shop. Many Air Force Bases have also completed Pollution Prevention Opportunity Assessment Reports (OARs) which outline alternative approaches that a Base can use for P2 in Base-specific operations, including rework of aircraft.

Lean Aircraft Initiative Program

The Lean Aircraft Initiative (LAI) is a three-year program which strives to define and foster dynamic, fundamental change in both the U.S. defense aircraft industry and government operations over the next decade. LAI is a cooperative venture of private industry, the U.S. Air Force, and the EPA, supported by the analytical and research expertise of the Massachusetts Institute of Technology. By building on and extending the "lean" paradigm through an organized process of research, the program seeks to develop the knowledge base that will lead to greater affordability of systems, higher quality, and increased efficiency including efficient use of materials.

Chemical Strategies Partnership

The Chemical Strategies Partnership (CSP), funded by the Pew Charitable Trusts, began a pilot project with Hughes Missile Systems Company and Nortel. The CSP project aims to reduce their use and release of toxic chemicals in manufacturing while improving production efficiency and competitiveness.

Joint Depot Environmental Panel (JDEP)

The Joint Policy Coordinating Group on Depot Maintenance in the Department of Defense chartered the Joint Depot Environmental Panel (JDEP) in 1988 to facilitate information exchange on environmental issues, technologies, and processes with potential application in the depot maintenance community. The JDEP's functions are to review the depot's current environmental program, compile information on techniques and processes with potential application, coordinate the development and implementation of environmental initiatives, and establish liaisons with federal agencies. The JDEP has hosted over 37 meetings and distributed over 500 technical briefings. Total dismantling of JDEP will occur in October 1998. (see JASPPA below.)

Joint Group on Acquisition Pollution Prevention (JGAPP)

The Department of Defense has developed the Joint Group on Acquisition Pollution Prevention (JGAPP) as a military/industry initiative to reduce the use of hazardous material in manufacturing processes. The initiative involves seven major corporations and their related services. The JGAPP is working with manufacturers at their facilities to reduce the use of specific hazardous materials in all of the programs at the facility.

Joint Acquisition & Sustainment Pollution Prevention Activity (JASPPA)

The Joint Logistics Commanders of the Department of Defense tasked the JGAPP and JDEP to explore the possibility of a single pollution prevention activity. Since then the JDEP and the Joint Pollution Prevention Advisory Board (JPPAB, which JGAPP is part of) have been working and meeting together to develop various avenues of consideration for that tasking. As a result, the JDEP and JPPAB have decided to merge to form a single integrated group called the Joint Acquisition & Sustainment Pollution Prevention Activity (JASPPA). The JASPPA will function as a single integrating activity for all pollution prevention efforts for both the acquisition and sustainment communities. (For more information, contact Carl Adams in the Joint Depot Maintenance Activities Group, (937)656-2771.)

Aerospace Environmental Roundtable

The Aerospace Environmental Roundtable is an informal monthly meeting coordinated by the Aerospace Industries Association(AIA). Attendees include other trade associations, contractors, and anyone else interested in discussing environmental issues, increasing awareness, and sharing information pertaining to the aerospace industry. (For more information, contact Glynn Rountree, (202)371-8401.)

VIII.C.2. Trade Associations

Aerospace Industries Association of America (AIA)
1250 Eye St. NW, Suite 1200 (202)371-8400
Washington, DC 20005 (202)371-8401 FAX
John Douglass, Pres.

AIA was founded in 1919 as a trade association which represents the nation's manufacturers of commercial, military and business aircraft, helicopters, aircraft engines, missiles, space craft, and related components and equipment. AIA maintains the AIA Aerospace Research Center to compile statistics on the industry. AIA's annual budget is roughly seven million dollars. They publish *Aerospace Facts and Figures* annually which contains statistical and analytical information on aircraft production, missile programs, space programs, and air transportation, as well as an annual report and an AIA newsletter.

Aircraft Electronics Association (AEA)
PO Box 1963 (816)373-6565
Independence, MO 64055-0963 (816)478-3100 FAX
Monte Mitchell, Pres.

AEA was founded in 1958 by companies engaged in the sales, engineering, installation, and service of electronic aviation equipment and systems. AEA works to advance the science of aircraft electronics, promote uniform and stable regulations and standards of performance, gather and disseminate technical data, and educate the aircraft electronics community and the public. They publish *Avionics News*, a monthly trade magazine. The annual budget is one million dollars.

American Helicopter Society (AHS)
217 N. Washington St. (703)684-6777
Alexandria, VA 22314 (703)739-9279 FAX
Morris E. Flatter, Exec. Dir.

AHS was founded in 1943 and is composed of aircraft designers, engineers, government personnel, operators, and industry executives in over forty countries interested in V/STOL aircraft. AHS conducts research and educational and technical meetings concerning professional training and updated information. They publish an annual composite of technical papers presented at the AHS forum, a quarterly journal, *Journal of the American Helicopter Society*, A bimonthly magazine, *VertFlite*, and other technical papers. They operate on a one million dollar budget.

Aviation Distributors and Manufacturers Association (ADMA)
1900 Arch St. (215)564-3484
Philadelphia, PA 19103-1498 (215)564-2175 FAX
Patricia A. Lilly, Exec. Dir.

ADMA was founded in 1943 as an association of wholesalers and manufacturers of general aviation aircraft parts, supplies, and equipment. They publish *ADMA News* bimonthly, *Aviation Education News Bulletin* bimonthly, and an annual directory.

Council of Defense and Space Industry Associations (CODSIA)
2111 Wilson Blvd., Suite 400 (703)247-9490
Arlington, VA 22201-3061
Peter Scrivner, Exec. Sec.

CODSIA was founded in 1964 and is comprised of the Aerospace Industries Association of America, Contract Services Association of America, Electronic Industries Association, National Security Industrial Association, Shipbuilders Council of America, American Electronics Association, Professional Services Council, and Manufacturers' Alliance for Productivity and Innovation. CODSIA holds three meetings per year in order to simplify, expedite, and improve industry-wide communications regarding policies, regulations, and problems.

Flight Safety Foundation (FSF)
2200 Wilson Blvd. Ste. 500 (703)522-8300
Arlington, VA 22201 (703)525-6047 FAX
Stuart Matthews, Pres.

FSF was founded in 1945 to represent aerospace manufacturers, domestic and foreign airlines, insurance companies, fuel and oil companies, schools, and miscellaneous organizations having an interest in the promotion of safety in flight. They have an annual budget of 2.5 million dollars and publish several bimonthly newsletters, studies, and an annual membership directory.

General Aviation Manufacturers Association (GAMA)
1400 K St. NW, Ste. 801 (202)393-1500
Washington, DC 20005 (202)842-4063 FAX
Edward W. Simpson, Pres.

GAMA was founded in 1970 as an association of manufacturers of aviation airframes, engines, avionics, and components. They strive to create a better climate for the growth of general aviation. GAMA publishes quarterly and

annual reports as well as films and printed material on the aviation industry.

Helicopter Safety Advisory Conference (HSAC)
PO Box 60220 (713)960-7654
Houston, TX 77205 (713)960-7660 FAX
Dick Landrum, Chm.

HSAC is comprised of helicopter operators, manufacturers, and others involved in the transport of workers by helicopter. HSAC promotes safety and seeks to improve operations through establishment of standards of practice. HSAC was founded in 1979.

International Society of Transport Aircraft Trading (ISTAT)
5517 Talon Ct. (703)978-8156
Fairfax, VA 22032-1737 (703)503-5964 FAX
Dawn O'Day Foster, Exec. Dir.

ISTAT was founded in 1983 as a society of professionals engaged in the purchase, sale, financing, manufacturing, appraising, and leasing of new and used commercial aircraft. ISTAT publishes a quarterly newsletter, *JeTrader*, and an annual membership directory.

Light Aircraft Manufacturers Association (LAMA)
22 Deer Oaks Ct. (510)426-0771
Pleasanton, CA 94588
Lawrence P. Burke, Pres.

LAMA was founded in 1984 as an association of manufacturers of experimental and ultralight aircraft, suppliers to the homebuilt aircraft community, media and other professionals involved with the light aircraft industry. LAMA works to assure that the interests of the industry are properly represented to the FAA and to Congress and provides uniform standards of manufacturing quality and airworthiness. LAMA publishes newsletters, standards, and a membership directory.

IX. CONTACTS/ACKNOWLEDGMENTS/RESOURCE MATERIALS

For further information on selected topics within the aerospace industry a list of contacts and publications are provided below.

Contacts⁵

Name	Organization	Telephone	Subject
Anthony Raia	USEPA, OECA	(202)564-6045	General notebook contact
Linda Nunn	California Air Resources Board	(916)323-1070	Risk Reduction
Glynn Rountree	Aerospace Industries Association	(202)371-8401	Industry Activities
Steven Geil	USEPA, OW	(202)260-9817	Clean Water Act
Barbara Driscoll	USEPA, OAQPS	(919)541-0164	Clean Air Act
George Smith	USEPA, OAQPS	(919)541-1549	Rocket Engine Test Firing/ Engine Test Facilities NESHAPs
Bruce Moore	USEPA, OAQPS	(919)541-5460	Micellaneous Metal Parts/ Plastic Parts NESHAPs
Ric Peri	National Air Transport Association	(703)845-9000	Industry Activities
Mary Dominiak	USEPA	(202)260-7768	Design for the Environment
Lieutenant Commander Michelle Fitzpatrick	US Coast Guard	(860)441-2859	Aircraft Rework P2

⁵ Many of the contacts listed above have provided valuable information and comments during the development of this document. EPA appreciates this support and acknowledges that the individuals listed do not necessarily endorse all statements made within this notebook.

Section II: Introduction to the Aerospace Industry

Aerospace Source Book, Aviation Week & Space Technology, January 12, 1998.

Smith, Bruce A., "Industry Outlook Is Mix of Growth, Stabilization," *Aviation Week & Space Technology*, March 23, 1998.

USDOC, *1992 Census of Manufactures Industry Series, Aerospace Equipment, Including Parts*, Bureau of the Census, Economics and Statistics Administration, US Department of Commerce, 1995.

USDOC, *U.S. Industry & Trade Outlook '98*, International Trade Commission, US Department of Commerce, McGraw-Hill, 1998.

USEPA/OAQPS, *National Emission Standards for Hazardous Air Pollutants for Source Categories: Aerospace Manufacturing and Rework-- Background Information for Proposed Standards*, Office of Air Quality Planning and Standards, USEPA, Research Triangle Park, NC, May 1994.

Section III: Industrial Process Description

California Air Resources Board, *Guidelines for the Aerospace Industry Facilities*, Emissions Assessment Branch, California Environmental Protection Agency, November 1997.

Horne, D.F. *Aircraft Production Technology*, Cambridge University Press, Cambridge, 1986.

Ohio EPA, *Extending the Life of Metal Working Fluids*, Fact Sheet Number 11, Office of Pollution Prevention, March 1993.

Ohio EPA, *Pollution Prevention in Painting and Coating Operations*, Fact Sheet Number 23, Office of Pollution Prevention, September 1994.

USEPA, *Guide to Cleaner Technologies, Alternative Metal Finishes*, Office of Research and Development, USEPA, September 1994.

USEPA/NRMRL, *Environmental Research Brief, Pollution Prevention Assessment for a Manufacturer of Aircraft Landing Gear*, National Risk Management Research Library, USEPA, Cincinnati, OH, August 1995.

USEPA/OAQPS, *Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations*, Office of Air Quality Planning and Standards, USEPA, Research Triangle Park, NC, December 1997.

USEPA/OAQPS, *National Emission Standards for Hazardous Air Pollutants for Source Categories: Aerospace Manufacturing and Rework-- Background Information for Proposed Standards*, Office of Air Quality Planning and Standards, USEPA, Research Triangle Park, NC, May 1994.

USEPA/OPPT, *Pollution Prevention Options in Metal Fabricated Products Industries*, Office of

Pollution Prevention and Toxics, USEPA, January 1992.

USEPA/ORD, *Guides to Pollution Prevention, The Fabricated Metal Products Industry*, Office of Research and Development, USEPA, Washington, DC, July 1990.

USEPA/OW, *Development Document for the Proposed Effluent Limitations Guidelines and Standards for the Metal Products and Machinery Phase I Point Source Category*, Office of Water, USEPA, April 1995.

USEPA/OECA, *Profile of the Motor Vehicle Assembly Industry*, Office of Enforcement and Compliance Assurance, USEPA, September 1995.

Section IV: Chemical Release and Transfer Profile

1995 Toxics Release Inventory Public Data Release, USEPA Office of Pollution Prevention and Toxics, April 1997. (EPA 745-R-97-005)

NIOSH Pocket Guide to Chemical Hazards, US Department of Health and Human Services, Center for Disease Control and Prevention, June 1994.

ChemFinder Database, <chemfinder.camsoft.com>

Section V: Pollution Prevention Opportunities

Air Force Center for Environmental Excellence, Environmental Quality Directorate, *Pollution Prevention Model Shop Report, Flightline Maintenance Shops*, Brooks Air Force Base, November 30, 1994, modified June 30, 1995.

Boeing Company Web Site, <www.boeing.com/company/offices/aboutus/environment>.
California Department of Health Services, *Waste Reduction for the Aerospace Industry*, Toxic Substances Control Program, Alternative Technology Division, April 1990.

Chao, S.C. and McHardy, J., *Progress in Supercritical CO₂ Cleaning*, Electro-Optical and Data Systems Group, Hughes Aircraft Company.

Dykema, Kevin J., and Larsen, George R., "The Greening of Corporate Culture: Shifting the Environmental Paradigm at Martin Marietta Astronautics Group," *Pollution Prevention Review*, Spring 1993.

Evanoff, Stephen P., "Environmental Resources Management, Case Study #4: Substitution of Low Vapor Pressure Organic Solvents and Aqueous Cleaners for CFC-113 Based Cleaning Solvents," *EPA/ICOLP Eliminating CFC-113 and Methyl Chloroform in Aircraft Maintenance Procedures*, October 1993.

Ohio EPA, *Extending the Life of Metal Working Fluids*, Fact Sheet Number 11, Office of Pollution Prevention, March 1993.

Ohio EPA, *Source Reduction and Metal Recovery Techniques for Metal Finishers*, Fact Sheet Number 24, Office of Pollution Prevention, September 1994.

State of Michigan, *Fact Sheet, Waste Reduction Checklist*, Office of Waste Reduction Services, Departments of Commerce and Natural Resources, December 1989.

USEPA, *Guide to Cleaner Technologies, Alternative Metal Finishes*, Office of Research and Development, USEPA, September 1994.

USEPA/NRMRL, *Environmental Research Brief, Pollution Prevention Assessment for a Manufacturer of Aircraft Landing Gear*, National Risk Management Research Library, USEPA, Cincinnati, OH, August 1995.

USEPA/OAQPS, *Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations*, Office of Air Quality Planning and Standards, USEPA, Research Triangle Park, NC, December 1997.

USEPA/OAR, *Eliminating CFC-113 and Methyl Chloroform in Aircraft Maintenance Procedures*, Office of Air and Radiation, USEPA, October 1993.

USEPA/OECA, *Profile of the Shipbuilding and Repair Industry*, Office of Enforcement and Compliance Assurance, USEPA, September 1997.

USEPA/OPPT, *Pollution Prevention Options in Metal Fabricated Products Industries*, Office of Pollution Prevention and Toxics, USEPA, January 1992.

USEPA/ORD, *Guides to Pollution Prevention, The Fabricated Metal Products Industry*, Office of Research and Development, USEPA, Washington, DC, July 1990.

Section VIII: Compliance Activities and Initiatives

Air Force Center for Environmental Excellence, *Pollution Prevention Model Shop Report, Flightline Maintenance Shops*, Environmental Quality Directorate, AFCEE, Brooks AFB, June 30, 1995.

Dominiak, Mary, "EPA Award Presented to the Experimental Aircraft Association," *P2 Newsletter*, December 1997.

Jaszczak, Sandra, ed. *Gale Encyclopedia of Associations*. 31st ed., International Thomson Publishing Co., 1996.

NASA, *Joint EPA/NASA/USAF Interagency Depainting Study*, Fifth Progress Report, November 1997.

"Project May Offer New Model for Supplier Relationships," *Business and the Environment*, August 1997.

USEPA/OAR, *Eliminating CFC-113 and Methyl Chloroform in Aircraft Maintenance Procedures*, Office of Air and Radiation, October 1993.